

12 September 1989

John Malleck
UNDERGROUND INJECTION CONTROL SECTION
USEPA Region II
Jacob K Javits Federal Building
New York, NY 10278

Dear Mr. Malleck:

Plugging and abandonment plans are enclosed for Brine Wells 27, 28, 30, 31, 37, 45, and 46 at the Akzo Salt Inc., Watkins Glen, New York salt refinery. Well specific procedures are included for each well.

Well 37 was previously used for brine production and has reached the end of its useful life. The other wells listed are entries into two salt caverns previously used for storing LPG. The product was removed in 1984 and the wells have been inactive since then. Small amounts of LPG are still present in the caverns and is now being bled off. The actual start of plugging operations will depend upon the time required to depressure the wells, but is now estimated to begin September 25 of this year. I have contacted Dermott Courtney, and will keep him informed as the schedule firms.

Sincerely,

Michael J. Schumacher

Minerals Development Engineer

MJS:fab Enclosure

L2: JMALLECK

xc: James A. Loose - attachment Gayle D. Petrick - attachment

> Gordon Aitken John A.C. Atkins

Akzo Salt Inc.
Abington
Executive Park
P O Box 352
Clarks Summit,
Pennsylvania
18411-0352
Phone and Fax:

717/587-5131 Cable: ISCO, Clarks Summit, PA Telex: 83-1872

SEPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460

PLUGGING AND ABANDONMENT PLAN

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Est	mated	Cost to Plug Wells						<u> </u>					
		\$24,000											

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFFICIAL TITLE (Please type or print)	
Michael J. Schumacher	
Minerals Development Engine	e

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WELL 37 - PLUGGING PROCEDURE

Background

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Gallery No. 6

	Size	Setting Depth
Surface Casing	13-3/8"	35′
Production Casing	8 - 5/8 "	1882 '
Top of Salt		1969'

This well was drilled in 1964. It was used for water injection and brine production until 1977, when production was completed.

The condition of the casing is unknown, and no cement bond logs exist, so the casing will be perforated and cement squeezed above the Marcellus shale to ensure that this formation and those below it will remain positively isolated from shallow formations.

- 1. Depressure gallery 6 by closing in water injection to wells 35 and 38. Bleed brine from well 35 to the brine pond until the pressure stabilizes (at about 80 psi at Well 37).
 - Bleed brine from Well 38 or 41 back to the plant until the pressure on Well 37 falls to 0 psi.
- 2. Place a workover rig on the well. Remove the 6" valve and 7" X 8-5/8" swage from Well 37 and install a blowout preventer.
- 3. Run a 7-5/8" bit and scraper to 1880'.
- 4. Set a bridge plug on tubing in the 8-5/8" casing at 1870'; pull tubing up 10 feet.
- 5. Place 133 sacks of class 'A' cement on top of the plug, top of cement should be at about 1400'.
- 6. Pull tubing from the well and perforate the 8-5/8" casing at 1350', with 4 shots per foot over a 5-foot interval.
- 7. Attempt to pump fluid into the well. If perforations will not accept flow at a surface pressure of 500 psi, place cement from the existing top of cement to the surface.
- 8. If perforation will accept flow, set a cement retainer at 1330' and squeeze 100 sacks of class 'A' cement into the perforations. Pull out of the retainer and place cement from the top of the retainer to the surface.
- 9. Rig down and clean up the area.
- Cut the casings off below grade and weld a plate over them.

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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460

PLUGGING AND ABANDONMENT PLAN

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NAME AND OFFI	IAL TITLE (Please type or print)
Michael J	Schumacher
Minerals	evelopment Engine

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WELL 27 - PLUGGING PROCEDURE

Background

Gallery No. 1

	Size	Setting Depth
Surface Casing	13-3/8"	21'
Production Casing	8-5/8"	2045'
Liner	5-1/2"	1924

This well was completed in 1957. It was used for LPG storaage between 1964 and 1984. The well has not been used since the gallery was emptied of LPG in 1984.

A 5-1/2" string was cemented in place in the 8-5/8" casing in 1978. A wireline cementing plug will be set near the bottom of this string and the well will be filled with cement.

- 1. Bleed off propane and brine as needed to depressure the well. Provide a 2" temporary brine line from the header to the wellhead to supply brine as needed to kill the well.
- 2. Rig up a wireline unit with a lubricator on top of the 6" TEE on the wellhead.
- 3. Pump a wiper plug down the well with 80 bbls of brine behind it to clean the 5-1/2" casing.
- 4. Set a wireline cementing plug in the 5-1/2" casing at 1850'.
- 5. Pump 209 sacks of class 'A' cement into the well with a rubber plug ahead of it.
- 6. Rig down and clean up the area.
- 7. Cut the casings off below grade and weld a plate over them.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460 PLUGGING AND ABANDONMENT PLAN NAME AND ADDRESS OF FACILITY NAME AND ADDRESS OF OWNER/OPERATOR Akzo Salt Inc. Akzo Salt Inc. Salt Point Road Salt Point Road Watkins Glen, NY 14891 Watkins Glen, NY 14891 STATE COUNTY PERMIT NUMBER LOCATE WELL AND OUTLINE UNIT ON NY Schuyler NYU 63860 SECTION PLAT - 640 ACRES SURFACE LOCATION DESCRIPTION Reading 7-1/2 Quad N 14 OF 14 SECTION TOWNSHIP LOCATE WELL IN TWO DIRECTIONS FROM NEAREST LINES OF QUARTER SECTION AND DRILLING UNIT 450 S 42 25 Lat. 16150 W 76 50 Long. 76°50' Long. Surface _ ft. from (N/S) ____ Line of quarter section ft. from (E/W) ____ Line of quarter section TYPE OF AUTHORIZATION WELL ACTIVITY ☐ Individual Permit CLASS I E Area Permit CLASS II D Rul ☐ Brine Disposal □ Enhanced Recovery Number of Wells __ ☐ Hydrocarbon Storage KOXCLASS III International Lease Name Brine Wells Well Number 28 CASING AND TUBING RECORD AFTER PLUGGING METHOD OF EMPLACEMENT OF CEMENT PLUGS The Balance Method SIZE TO BE PUT IN WELL (FT) TO BE LEFT IN WELL (FT) HOLE SIZE ☐ The Dump Bailer Method 14 49 The Two-Plug Method 8-5/8 36 2616 Other 22.6 2590

CEMENTING TO PLUG AND ABANDON DATA:	PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
Size of Hole or Pipe in which Plug Will Be Placed (inches)	7	7	7	7			
Depth to Bottom of Tubing or Drill Pipe (ft.)		1190		1275			
Sacks of Cement To Be Used (each plug)		121		239			
Slurry Volume To Be Pumped (cu. ft.)	+	143		282			
Calculated Top of Plug (ft.)		1350		Surf			
Measured Top of Plug (if tagged ft.)	2000		1280				
Slurry Wt. (Lb./Gal.)	1 +	15.6		15.6			
Type Cement or Other Material (Class III)	CastIron		CastIro				

LIST ALL OPEN HOLE AND/OR PERFORATED INTERVALS AND INTERVALS WHERE CASING WILL BE VARIED (If any)

From	То	From	То		
1300	1305	Perforate & Squeeze	100 sks class 'A'		
	-				
nated Cost to Plus Welle					

Estimated Cost to Plug Wells

\$14,000

CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFFICIAL TITLE (Please t)	ype or print)
Michael J. Schumacher	r
Minerals Development	Engineer

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WELL 28 - PLUGGING PROCEDURE

Background

Gallery No. 1

	Size	Setting Depth
Surface Casing	14"	49'
Production Casing	8-5/8"	2616 ′
Production Casing	[*] 7"	2590 ′
Top of Salt		1909'

This well was completed in 1957. It was utilized as a water and brine well when Gallery No. 1 was used for LPG storage between 1964 and 1984. This well has not been used since 1984, and remaining salt reserves do not justify returning it to service.

A 7" liner was cemented in place inside the 8-5/8" casing in 1977. Because of the poor cement bond resulting from the small annular area between these casings, they will be perforated and cement will be squeezed to ensure isolation of the Marcellus Shale and deeper formations.

- 1. Bleed brine to the plant as necessary to depressure the cavern.
- Place a workover rig over the well. Remove the 6" valve and install a blowout preventer.
- 3. Set a bridge plug on 2-7/8" tubing in the 7" casing at 2000'; pull the tubing up 10 feet.
- Place 121 sacks of class 'A' cement on the plug.
 Pull the tubing string out of the well.
- 5. Perforate a 5-foot interval at 1300' with 4 shots per foot.
- 6. Attempt to pump fluid into the perforations. If they will not accept flow at a surface pressure of 500 psi, place cement from 1300' to the surface.
- 7. If the perforations will accept flow, set a cement retainer at 1280' and squeeze 100 sacks of class'A' cement into the perforations. Pull out of the retainer and place cement from the top of the retainer to the surface.
- Rig down and clean up the area.
- 9. Cut the casings off below grade and weld a plate over them.

SEPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460

PLUGGING AND ABANDONMENT PLAN

Akzo	Salt Inc.	CILITY					Akzo	Salt Inc		ERATOR		
	Point Road ins Glen, NY	14891						Point Ro		001		
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	ATE WELL AND OUTLI			NY		Sch	uyler			NYU 6		
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16	65	ļ		152					o-Plug Metho			
11-3/4			1492					Other				
8-5/8	32			1897								
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MAME AND OFFICIAL TITLE (Please type or print)
Michael J. Schumacher
Minerals Development Engineer

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the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

9/11/89

WELL 46 - PLUGGING PROCEDURE

Background

Gallery No. 1

Size	Setting Depth
16"	152 '
11-3/4"	1492'
8-5/8"	1897 '
7"	1886 '
	1840′
	16" 11-3/4" 8-5/8"

This well was drilled in 1970 to recover LPG from a high point in the cavern. It was used for LPG movements until the gallery was emptied of product in 1984.

A 7" tubing string was placed in 1978. This string will be removed and cement will be placed in the 8-5/8" casing.

_ _ -

- 1. Rig up a temporary 2" line from the brine header to the well to provide brine if required to fill the well if the cement plug leaks.
- Rig up a service rig over the well.
- 3. Plug the well back by pumping 100 sacks of 50/50 Pozmix cement into the well followed by a wiper plug and 75 barrels of brine. Allow to set up 24 hours, then bleed any pressure off.
- 4. If the pressure bleeds off quickly, tag the top of the cement with wireline. If the top of cement is above the bottom of the 7" tubing, install a blowout preventer and run a 6-1/4" bit down to clear the tubing before pulling it.
- 5. Lift the 7" string to release the packer, then set back down. If the annulus does not pressure up, lift the 7" string and strip a blowout preventer over it. Pull the 7" tubing from the well and lay down.
- 6. Set a bridge plug in the 8-5/8" casing at 1850' on 2-7/8" tubing. Pull the tubing up 5 feet.
- 7. Place class 'A' cement from the top of the plug to surface, staging as necessary to allow the workstring to be pulled from the well.
- 8. Rig down and clean up the area.
- 9. Cut the casings off below grade and weld a plate over them.

SEPA

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460

PLUGGING AND ABANDONMENT PLAN

A S	kzo alt	ND ADDRESS OF FAC Salt Inc. Point Road ins Glen, NY	14891					Akzo Salt	Salt Inc Point Ro	ad			
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NAME AND OFF	ICLA	L TITLE (Please t	ype or print)
Michael d].	Schumache	r
Minerals	De	evelopment	Engineer

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DATE SIGNED

9/11/89

WELL 30 - PLUGGING PROCEDURE

Background

Gallery No. 2

	Size	Setting Depth
Surface Casing	16"	74'
Production Casing	10-3/4"	2506 ′
Lining Casing	7"	2480'
Top of Salt		2080′

This well was drilled in 1958. It was used for LPG storage from 1964 to 1984. It has been idle since the cavern was emptied of product in 1984. A 7" liner was cemented inside the 10-3/4" casing in 1978.

A cementing plug will be set in the bottom of the inner casing and cement will be placed to the surface. The plug will be set by wireline to avoid exposure to LPG which may escape from the flat cavern roof.

- 1. Bleed off propane before beginning work. Provide a 2" temporary brine line from the header to the side of the wellhead to supply brine as needed to kill the well.
- 2. Rig up a wireline unit with a lubricator on top of the 6" crown valve.
- 3. Pump a wiper plug down the well with 120 barrels of brine to clean the 7" casing.
- 4. Set a wireline cementing plug in the 7" casing at 2460'.
- 5. Pump 460 sacks of class 'A' cement into the well with a rubber plug ahead of it.
- 6. Rig down and clean up the area.
- 7. Cut the casings off below grade and weld a plate over them.

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V.	.I.A			PLU	GGING	AND AB	ANDON	MENT P	LAN		
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	Salt Inc.					The state of the s	Salt Inc.				
	Point Road	14001					Point Roa				
Watki	ns Glen, NY	14891				Watki	ns Glen,	NY 1489			
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	S	1 1 1]	Lease I		ernatione Well		Well Num	ber 31		
	CASING	AND TUBING R	ECORD	AFTER PLUG	GING		METHOD	OF EMPLACES	MENT OF CEMI	ENT PLUGS	
							The Bal	lance Metho	4		
SIZE	WT(LB/FT)	TO BE PUT IN WE	LL (FT) T	O BE LEFT IN V	VELL (FT)	HOLE SIZE		ump Bailer Method			
8-5/8	36			120				o-Plug Meth			
5-1/2	14			2366			Other	o-i log ivietii			
		,									
	CEMENTING TO PLU	IC AND ABANDO			1 21112 111	T	ļ				
	le or Pipe in which P				5-1/2	5-1/2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7
	Bottom of Tubing or D		inche	5)	3-1/2	1995	ļ		 	ļ	
	Coment To Be Used (e					226	ļ		 	ļ	
	ume To Be Pumped (267	 		ļ	ļ	
	Top of Plug (ft.)	cu. n.,					ļ		ļ		
					2000	Surf	ļ		ļ	ļ	ļ
	Top of Plug (if tagger	а п.)			2000	1 -1 - 2				ļ	
	(Lb./Gal.)				4	15.6					
Type Cem	ent or Other Material				<u>CastIro</u>		L		L		L
	LIST	ALL OPEN HOLE	AND/C		TED INTERVA	LS AND INTERV	ALS WHERE CA	ASING WILL B	E VARIED (If ar	lyi	
	Frem			Тр			From			То	
	-										

Estimated Cost to Plug Wells

\$14,000

CERTIFICATION

I certify under the penalty of law that I have personally examined and am familiar with the information submitted in this document and all attachments and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)

NAME AND OFF	CIAL TITLE (Please typ	e or print)
Michael d	1. Schumacher	r
Minerals	Development	Enginee

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111	46 on	uma	~
/	, ,		

9/11/89

WELL 31 - PLUGGING PROCEDURE

Background

Gallery No. 2

	Size	Setting Depth
Surface Casing	8-5/8"	120'
Production Casing	5-1/2"	2366 ′
Tubing	4"	2013 '
Top of Salt		2016'

This well was drilled in 1961 to be used in conjunction with Well 30. It was originally used for water and brine movements, but was used for LPG storage after Well 45 was completed in 1967. A 4" flush joint tubing string with a packer on the bottom was placed in the well in 1978.

The tubing string will be pulled from the well, then a bridge plug will be placed in the 5-1/2" string and cement placed to the surface.

- 1. Rig up a temporary 2" line from the brine header to the well to supply brine as needed to kill the well.
- 2. Rig up a service rig over the well.
- 3. Plug the well back by pumping 50 sacks of 50/50 Pozmix cement into the well followed by a wiper plug and 26 barrels of brine. Allow the cement to set up for 24 hours, then bleed any pressure off.
- 4. If the pressure bleeds off quickly, lift the 4" string to release the packer, then set back down. If the annulus does not pressure up, lift the 4" string and strip a blowout preventer over it. Pull the 4" tubing from the well and lay down.
- 5. Set a bridge plug in the 5-1/2" casing at 2000' on 2-7/8" tubing. Pull the tubing up 5 feet.
- 6. Place class'A' cement from the top of the plug to the surface, staging as necessary to allow the workstring to be pulled from the well.
- 7. Rig down and clean up the area.
- 8. Cut the casings off below grade and weld a plate over them.

SEPA

EDA Enro 7520 1410 041

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY WASHINGTON, DC 20460

VLIM	PLU	GGING	AND AB	ANDON	MENT P	LAN				
NAME AND ADDRESS OF FACILITY			NAME AN	D ADDRESS OF	F OWNER/OPE	RATOR				
Akzo Salt Inc.			Akzo	Salt Inc	•					
Salt Point Road			Salt	Point Ro	ad					
Watkins Glen, NY 14891			Watki	ns Glen,	NY 148	91				
LOCATE WELL AND OUTLINE UNIT ON	STATE	COUNT				PERMIT	NUMBER			
SECTION PLAT - 640 ACRES	NY		nuyler			NYU	63860			
N	SURFAC			Reading			uad			
	LOCATE	14 OF	14 OF	1/4 SECT		TOWNSHIP	RAN			
		/501.	42 25	ROM NEAREST	LINES OF QU 169	OO'WOK	50' Lon	NG UNIT		
	Surfac			ine of quarter s		°°, °° .)O TO11	g.		
l l-i-i-i-l-i-i-i-	l									
	and_		W) Line AUTHORIZAT	of quarter section	on T	VA/FILL A	TI (17)			
	l			ION		WELL AC	TIVITY			
W	XX Area	idual Permit			CLASS					
	Rul.	Tomat				ne Disposal				
	Number	r of Wells			☐ Enhar	nced Recovery				
	Number	r or vveils			XX CLASS	carbon Stora	ge			
			ernatio							
S	Lease N	_{lame} Bri	ne Well	LS	Well Numb	per 45				
CASING AND TUBING RECORD AF	TER PLUG	GING		METHOD	OF EMPLACEM	ENT OF CEME	NT PLUGS			
				XX The Bal	ance Method					
SIZE WT(LB/FT) TO BE PUT IN WELL (FT) TO	BE LEFT IN W	ÆLL (FT) H	IOLE SIZE		mp Bailer Me					
13-3/8 48	218				o-Plug Metho					
8-5/8 32	2816			Other						
<u> </u>										
CEMENTING TO PLUG AND ABANDON DATA:		PLUG #1	PLUG #2	PLUG #3	PLUG #4	PLUG #5	PLUG #6	PLUG #7		
Size of Hole or Pipe in which Plug Will Be Placed (inches) Depth to Bottom of Tubing or Drill Pipe (ft.)		8-5/8	8-5/8							
Sacks of Cement To Be Used (each plug)			2275 660					ļ		
Slurry Volume To Be Pumped (cu. ft.)			780							
Calculated Top of Plug (ft.)			Surf							
Measured Top of Plug (if tagged ft.)		2280	- Curr							
Slurry Wt. (Lb./Gal.)		1 4	15.6							
Type Cement or Other Material (Class III)		CastIror	ClassA							
LIST ALL OPEN HOLE AND/OR	PERFORAT	TED INTERVAL	S AND INTERV	ALS WHERE CA	SING WILL BE	VARIED (If an	y)	<u></u>		
Frgm -	Το			From			To			
Estimated Cost to Plug Wells			-J			<u> </u>				
¢10,000										
\$19,000										
		050711								
			ICATION							
I certify under the penalty of law	that I h	ave perso.	nally exam	ined and ai	m familiar	with the in	nformation			
submitted in this document and all attachments and that, based on my inquiry of those individuals										
immediately responsible for obtaining the information. I believe that the information is true, accurate										
and complete. I am aware that there are significant penalties for submitting false information, including										
the possibility of fine and imprisonment. (Ref. 40 CFR 144.32)										
NAME AND OFFICIAL TITLE (Please type or print)	SIG	NATURE			-	DATE SIG	SNED			
Michael J. Schumacher	-	Zini					1/1.10	99		
Minerals Development Engineer		11/4/	26.	/_		1 5	1/11/8	/		

WELL 45 - PLUGGING PROCEDURE

Background

Gallery No. 2

	Size	Setting Depth
Surface Casing	13-3/8"	218'
Production Casing	8-5/8"	2816 '
Tubing	7"	2290'
Tubing	5-1/2"	585 ′
Top of Salt		2054'

This well was drilled in 1967 and was used as a water and brine well while Gallery No. 2 was used for LPG storage up to 1984.

A 7" liner was put in the well in 1978, and the 7" and 8-5/8" strings were perforated at a depth of 535' in 1982. A 5-1/2" tubing was placed in the well with a packer to isolate the perforated area.

The tubing string will be removed, a bridge plug will be set in the bottom of the casing, and cement will be placed to the surface.

- Verify depressurization of tubing, 5-1/2" X 7" annulus, and 7" X 8-5/8" annulus. Run a temporary 2" line from the brine header to the well to supply brine, if required to kill the well.
- 2 Set a service rig over the well and remove top valve.
- 3. Pull the 5-1/2" string and lay down.
- 4. Lift 7" string and strip blowout preventer over it.
- 5. Pull the 7" string and lay down.
- 6. Set a bridge plug on 2-7/8" tubing in the 8-5/8" casing at 2280' and pull up 5 feet.
- 7. Pump 660 sacks of class 'A' cement into the well through the tubing, staging as necessary to avoid cementing the tubing in the hole.
- 8. Rig down and clean up the area.
- 9. Cut the casings off below grade and weld a plate over them.